

16. (Amended) An apparatus according to claim 15 wherein said cassette has a mechanical rectifier which locks said cassette in engagement with said analyzer disk.

17. (Amended) An apparatus according to claim 15 wherein said inlet has a conduit having a first end for penetrating said subject and a second end for penetrating the wall of said cassette which defines said cavity.

18. (Amended) An apparatus according to claim 15 having a reagent or washing solution for said sample.

19. (Amended) An apparatus according to claim 15 having an electrical component or microelectromechanical component.

20. (Amended) An apparatus according to claim 15 having an applicator for housing said cassette prior to engagement of said cassette with said analyzer disk.

21. (Twice Amended) An analyzer disk assembly comprising:  
an analyzer disk having a surface adapted to engage an apparatus which contains a biological sample for transfer to said analyzer disk; and  
an apparatus engaged with said surface of said analyzer disk, said apparatus including:  
a cassette having walls which define a cavity for containing said biological sample;  
an inlet for introducing said biological s into said cavity prior to engagement of said apparatus with said surface of said analyzer disk; and  
an outlet for transferring said biological sample from said cavity to said analyzer disk when said apparatus is engaged with said surface of said disk.

22. (Twice Amended) An analyzer disk according to claim 21 wherein said cassette has a mechanical rectifier which locks said cassette in engagement with said surface of said disk body.

23. (Twice Amended) An analyzer disk according to claim 21 wherein said inlet has a conduit having a first end for receiving said biological sample and a second end for penetrating the wall of said cassette which defines said cavity.

24. (Twice Amended) An analyzer disk according to claim 21 wherein said apparatus has a reagent or washing solution for said sample.

25. (Twice Amended) An analyzer disk according to claim 21 wherein said apparatus has an electrical component or microelectromechanical component.

26. (Twice Amended) A method for transferring a biological sample from a subject to an analyzer disk, said method comprising:

transferring the biological sample from the subject to a cavity of a cassette;  
engaging said cassette with an analyzer disk; and  
transferring the biological sample from said cassette to said analyzer disk.

27. (Twice Amended) A method according to claim 26 wherein said cassette has a reagent or washing solution, said method further includes contacting said reagent or washing solution with said biological sample located within said cavity of said cassette.

28. (Twice Amended) A method according to claim 26 which further includes locking said cassette in engagement with said analyzer disk.

29. (Amended) A method according to claim 26 wherein said cassette further has a conduit having a first end and a second end, wherein said method further includes penetrating said subject with said first end and penetrating a wall of said cavity of said cassette with said second end to provide transfer of said biological sample from said subject to said cavity.

30. (Twice Amended) A method according to claim 26 wherein said cassette further has an electrical component or microelectromechanical component, said method further includes treating said biological sample located in said cavity of said cassette with said electrical component or said microelectrochemical component.

B3  
31. (Amended) An apparatus according to any one of claims 15 through 25 wherein said analyzer disk is an optical disc.

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B4  
37. (Amended) A method according to any one of claims 26 through 30 wherein said analyzer disk is an optical disc.

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Please cancel claims 32-36 and 38-39

Please add the following additional claims:

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40. The method of claim 26 including providing a vacuum within said cavity of said cassette prior to transferring said sample from said subject to said cavity to facilitate said transferring.

41. The method of claim 26 including inserting a needle associated with said cassette into a subject's blood vessel as part of said transferring.

42. The method of claim 41 including pressing a stopper associated with said cassette against said subject's skin to limit penetration of said needle into said subject.

43. The method of claim 40 including pushing a moveable needle associated with said cassette through a septum inside said cassette while transferring said sample from said subject to said cassette through said needle.

44. The method of claim 43 including pushing said needle by engaging a stopper associated with said cassette and needle against the skin of said subject.

45. An apparatus for collecting a biological sample from a subject for subsequent transfer to an analyzer disk, said apparatus comprising:

a cassette having walls which define a cavity for receiving said biological sample, said cassette being adapted to engage said analyzer disk; and

a needle-like conduit for transferring said biological sample from the subject into said cavity and for transferring said biological sample from said cavity to said analyzer disk when said cassette is engaged with said analyzer disk.

46. An apparatus according to claim 45 wherein said cassette has a mechanical rectifier which locks said cassette in engagement with said analyzer disk.

47. An apparatus according to claim 45 wherein said conduit having a first end for penetrating said subject and a second end for penetrating a wall of said cassette which defines said cavity.

48. An apparatus according to claim 45, wherein said cassette has a reagent or washing solution.

49. An apparatus according to claim 45 wherein said cassette has an electrical component or microelectromechanical component.

50. An apparatus according to claim 45 wherein said apparatus includes an applicator for housing said cassette prior to engagement of said cassette with said analyzer disk.

51. An analyzer disk assembly comprising:  
an analyzer disk having a surface adapted to engage an apparatus which contains a biological sample for transfer to said analyzer disk; and an apparatus engaged with said surface of said analyzer disk, said apparatus including:

a cassette having walls which define a cavity for containing said biological sample and a conduit for introducing said biological samples into said cavity prior to engagement of said apparatus with said surface of said analyzer disk and for transferring said biological sample from said cavity to said analyzer disk when said apparatus is engaged with said surface of said disk.

52. An analyzer disk according to claim 51 wherein said cassette has a mechanical rectifier which locks said cassette in engagement with said ~~surface~~ <sup>of</sup> said disk body.

53. An analyzer disk according to claim 51 wherein said conduit has a first end for receiving said biological sample and a second end for penetrating the wall of said cassette which defines said cavity.

54. An analyzer disk according to claim 51 wherein said apparatus has a reagent or washing solution for said sample.

55. An analyzer disk according to claim 51 wherein said apparatus has an electrical component or microelectromechanical component.

56. A liquid biological sample collection unit for use with a centrifugal analyzer disk, said collection unit including a cassette which is flat to fit on a surface of said analyzer disk and having at least one needle-like conduit to receive a biological sample directly from a subject and which connects into said disk when said cassette is placed onto said surface to transfer said sample directly from said cassette into said disk.

57. The liquid biological sample collection unit of claim 56 wherein said cassette has an evacuated inner cavity which has an internal pressure below that of atmospheric pressure.

58. The liquid biological sample collection unit of claim 56 wherein said cassette includes a battery to provide electrical energy for use with said cassette.

59. The liquid biological sample collection unit of claim 56 wherein said cassette includes a liquid pump to assist delivery of said sample into said disk.

60. The liquid biological sample collection unit of claim 56 wherein said cassette includes a light source.

61. The liquid biological sample collection unit of claim 56 wherein said cassette includes assay elements to assist in performing assays.

62. The liquid biological sample collection unit of claim 56 wherein said cassette includes a microprocessor.

63. The liquid biological sample collection unit of claim 56 wherein said collection unit includes an applicator to which said cassette is mounted for manipulation of said cassette relative said subject and said disk by manipulation of said applicator.

64. The liquid biological sample collection unit of claim 63 wherein said applicator is partially transparent, said cassette is mounted at least partially within said applicator and said cassette is at least partially visually apparent from the outside of said applicator

65. The liquid biological sample collection unit of claim 63 wherein one or more compression rods are provided within said applicator for manually pressing said cassette.

66. The liquid biological sample collection unit of claim 65 wherein button means are associated with said one or more rods to facilitate manual movement of said cassette from said applicator by manually pressing said button.

67. The liquid biological sample collection unit of claim 63 wherein said applicator is provided with guide surfaces to guide said cassette out of said applicator in an orientation relative said applicator to facilitate placing said cassette onto said surface of said disk.

68. The liquid biological sample collection unit of claim 56 wherein said cassette configuration is asymmetry to prevent misplacement of said cassette on said surface of said disk.

69. The liquid biological sample collection unit of claim 56 wherein said cassette fits to said analyzer disk either top or bottom sides up.

70. The liquid biological sample collection unit of claim 56 wherein said cassette has an internal cavity wherein said cavity volume is on the order of about 0.1 $\mu$ l to about 800 $\mu$ l.

71. The liquid biological sample collection unit of claim 56 wherein said cassette has an internal cavity having internal dimensions of about 0.1mm x 1mm x 1mm to about 2.0 mm x 10mm x 40mm.

72. The liquid biological sample collection unit of claim 59 wherein said applicator is masked to show proper orientation of said cassette to said disk.

73. The liquid biological sample collection unit of claim 56 wherein said cassette has internal surfaces that come in contact with said biological sample, one or more such surfaces being coated by one or more of the group including detergents, proteins, carbohydrates, oligo and polynucleotides, and synthetic polymers.

74. The liquid biological sample collection unit of claim 56 wherein said cassette has internal surfaces and one or more of said surfaces has a coating of a nonionic detergent.

75. The liquid biological sample collection unit of claim 56 wherein said cassette has internal surfaces and one or more of said surfaces has a coating of a protein selected from the group of albumin, collagen, fibrin, avidin immunoglobulins, streptavidin and fragments and analogs thereof.

76. The liquid biological sample collection unit of claim 56 said cassette has internal surfaces and one of more of the said surfaces has a coating of a carbohydrate selected from the group cellulose, starch, dextran or heparin.

77. The liquid biological sample collection unit of claim 56 said cassette has internal surfaces and one of more of the said surfaces has a coating of synthetic polymers are selected from the group polyvinylalcohol, polylactic acid and polyethylene glycol.

78. The liquid biological sample collection unit of claim 56 said cassette has internal surfaces and one of more of the said surface has a surface bound oligonucleotides and/or polynucleotides to attach to molecules and particles that are conjugated with complementary oligonucleotides.

79. A liquid biological sample collection unit of claim 63 wherein said applicator is provided with corrugations within said applicator to reduce backsliding of a cassette within said applicator.

80. The apparatus of claim 15 wherein a removable plug is associated with said outlet of said cassette to facilitate transfer of said sample into said disk only when said plug is removed.



81. The apparatus of claim 15 including means associated with said applicator to compress said cassette whereby upon insertion of said inlet into a subject, releasing of compression on said cassette creates a vacuum within said cassette to facilitate transfer of said sample into said cassette.

82. The apparatus of claim 15 including means associated with said cassette for creating a vacuum within said cassette before a sample is transferred into said cassette.

83. The apparatus of claim 20 wherein a plurality of cassettes are provided within said applicator.

84. The apparatus of claim 15 wherein said inlet includes a needle covered by a removable tubing.

85. The apparatus of claim 15 wherein said tubing is provided for use in obtaining biological samples including urine from subjects or containers.

? 86. The apparatus of claim 51 wherein said cassette includes a means for puncturing a membrane or septum of the cassette after said conduit is inserted into a subject.

87. The apparatus of claim 51 wherein said cassette is mounted within an applicator.

88. The apparatus of claim 87 wherein said applicator has one or more supports to stabilize said cassette within said applicator

89. The apparatus of claim 87 wherein said applicator includes means for ejecting said cassette partially or entirely from said applicator.

90. The apparatus of claim 89 wherein said means for ejecting includes a manually operable button.

91. The apparatus of claim 89 wherein said means for ejecting includes means to tilt said cassette with respect to a long axis of the applicator as it is ejected.

92. The method of claim 26 including transferring said biological sample from said cassette to said analyzer disk while said disk is rotating.

93. The method of claim 26 including introducing a liquid into said cassette while said sample is being transferred into said disk.

94. The method of claim 26 including introducing air into said cassette while said sample is being transferred into said disk.

95. The analyzer disk assembly of claim 51 including means to insure that said cassette is not reused once it has received a biological sample.

96. The apparatus of claim 95 wherein said means to insure that said cassette is not reused includes means for locking said cassette to said disk so that it cannot be easily removed.

97. The apparatus of claim 96 wherein said means for locking includes a mechanical rectifier.

98. The apparatus of claim 97 wherein said mechanical rectifier includes corrugated surfaces.

99. The analyzer disk assembly of claim 51 including means for giving a visual signal when said cassette is securely engaged with said disk.

100. The analyzer disk assembly of claim 51 wherein said cassette and disk have markings thereon to facilitate proper relationship of said cassette relative said disk by arranging said marking to form a unified pattern.

96C27 101. The analyzer disk assembly of claim 51 including means for giving a noise signal when said cassette is securely engaged with said disk.

102. The analyzer disk assembly of claim 51 wherein said cassette has preloaded reagents.

103. The assembly of claim 102 wherein said reagents are localized in separate compartments as solids or dissolved into water or a bugger.

104. The assembly of claim 102 wherein said reagents are stored inside a gel from which they are extracted by the sample.

105. The assembly of claim 102 including a battery or other electrical or microelectromechanical component that may be used for assaying the biological sample.

106. The assembly of claim 105 wherein said components are selected from the group light sources, such as lasers and light emitting diodes, assay elements, microprocessors, electrodes, pumps and valves.

107. The assembly of claim 51 including a disinfectant in said cassette to kill pathogenic agents and prevent microbial growth before the disposal of the analyzer disk.

108. The assembly of claim 51 wherein said cassette has at least one needle and at least one septum formed in a wall of said cassette cavity.

109. The assembly of claim 108 wherein said at least one septum is formed by a thinner wall area of said wall of said cassette cavity.

110. The assembly of claim 51, wherein said cassette is made of an elastic plastic material to facilitate compression of said cassette before transfer of a sample into said cassette.

111. The assembly of claim 51 wherein said cassette is transparent or semitransparent so that the filling of said cassette with a biological sample can be visually confirmed.

112. The assembly of claim 51 wherein said cassette has a wall or partition for promoting circulation of incoming reagent solutions through a first tube, a needle, a wall or partition, a second tube and said first tube, about said wall or partition and out through said septum when the later is penetrated by said second tube.

113. The assembly of claim 112 wherein said disk has a third tube and a second needle and said cassette has second and third septums.

114. The assembly of claim 51 wherein said disk has a lid spaced from said surface of said disk where said cassette is to be engaged and said cassette has an incline edge provided to fit under said lid.

115. The collection unit of claim 56 wherein means are provided for retaining said cassette on said disk;

116. The collection unit of claim 115 wherein said means for retaining includes a shoulder provided on said disk.

117. The collection unit of claim 115 wherein said means for retaining includes one or more corrugated sides on said cassette and disk.

118. The collection unit of claim 115 wherein said means for retaining includes the provision of one or more needles associated with said cassette which are of a harpoon shape.

119. The collection unit of claim 63 wherein a part of the applicator is transparent so that the cassette can be seen visibly from outside the applicator.

120. The collection unit of claim 119 wherein the transparent part is lens shaped so that the cassette is magnified.

121. The collection unit of claim 63 wherein said cassette is compressible and said applicator has means for providing a vacuum in a cassette housed in said applicator said means includes a spring loaded button and operably linked compressing rods whereby when the button is pushed, one of more of said operably linked compression rods will act on said cassette to provide a partial vacuum in the cassette.

122. The collection unit of claim 121 including means for ejecting said cassette from said applicator said means includes said button and rods whereby after the sample is in and the cassette is ready for insertion into the analyzer disk pressing said button moves said compression rods which then serve as pushing rods to guide the cassette in an exit route.

123. The collection unit of claim 63 wherein said applicator is provided with one or more exit slits shaped to tilt said cassette as it is pushed out of said applicator to facilitate positioning of said cassette into said analyzer disk.

124. The method of claim 26 including the provision of an applicator for housing said cassette and the step of pushing said cassette by said applicator into engagement with said disk, whereby said cassette is manipulated by said applicator without touching of the cassette by hand at anytime while the sample is taken or analyzed.

125. The collection unit of claim 56 wherein said cassette has an inner cavity to receive a biological sample, a wall area of said cavity being provided to be punctured, a needle and means for guiding said needle for movement from a patent engaging position of a first end of said needle and a second position where a second end of said needle punctures said wall area when said needle is used to obtain a biological sample from a patient.

126. The collection unit of claim 56 including means for mounting said needle in said cassette for movement in an axial direction of said needle relative said cassette.

127. The collection unit of claim 56 including means for moveably mounting said needle to said cassette which said needle-like conduit in a first position to engage a patient to receive a biological sample and for guiding said needle inwardly of said cassette.

128. The cassette of claim 127 including a stopper associated with said conduit to limit penetration of said conduit into said patient and to press said conduit inwardly of said cassette when said stopper engages a patient's skin.

Sub C3 129. The assembly of claim 51 including wells within said cavity for receiving one or more reagents.

130. The assembly of claim 129 wherein the wells may have walls of a height so that they are substantially closed by the cover when a vacuum exists inside the sample cassette but open when the cassette is filled with a biological sample and the vacuum is released .

131. The assembly of claim 51 wherein the cassette cavity has passive supporting structures so that it does not collapse when a vacuum is produced inside the cassette cavity.

132. The assembly of claim 51 wherein sidewalls of the cassette have a groove that substantially surrounds the cavity of said cassette.

133. The assembly of claim 132 including a cassette cover having a ridge that substantially fits said groove.

134. The assembly of claim 51 wherein inner surfaces of said cassette are laminated with ammonia plasma.

135. The assembly of claim 51 wherein inner surfaces of said cassette are treated by an excess of 1, 4 phenylene di-isocyanate.

136. The assembly of claim 135 wherein said surfaces are also treated with heparin to provide a surface covered by immobilized heparin to inhibit blood coagulation.

137. The assembly of claim 51 wherein said cassette is provided substantially in the shape of a syringe.